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COLLOCATED TUNABLE WAVENUMBER SENSOR/ACTUATORS FOR SMART STRUCTURES

CDRL A001.11

Covering the period: 1 August to 31 August 1993

Submitted to:

Office of Naval Research
Scientific Officer
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Submitted by:

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L. Jones

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September 1, 1993

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Contract progress and activities since CDRL A001.10.

Summary of progress

- Release of remaining contract funds approved as of 23 July 1993.
- New tasks, as listed in the 28 April rescheduling option, are planned following the attached schedule.
- One green actuator module was prepared and is currently in burn out -- for this first iteration the burn-out schedule will be:
 - 5°C/hour to 500°C
 - hold for 5 hours at 500°C
 - cool at 50°C/hour to room temperature
 - 3 cfm air flow
- A pad of smaller actuators is currently being prepared so that there will be sufficient samples for mechanical testing next month.

Telephone calls, trips, and significant results

- Dr. Keith Bridger and Alex Bailey attended the ONR Working Group Review on 13 July, with Mr. Bailey presenting.

Results bearing on prior problem areas

- No prior problem areas.

Programmatic changes

- Dr. Keith Bridger assumed the position of Program Manager effective 1 August 1993.
- Program schedule is as shown on the attached page.

Technical or scheduling problem areas

- None -- this program is off to a flying start.

Contract and cost schedule status

- Expended funds as of 29 August 1993, including expenditures prior to 23 July, were \$113K against a current budget of \$119K.
- A revised cost schedule, reflecting the 23 July program restart, is attached.

Plans for September 1993

- Mechanical measurements will be made on the first set of small actuators.
- The first full-size actuator will be examined for defects and the next iteration begun.
- Electromechanical modelling on the actuators will be conducted to verify the design and initial measurements will begin -- assuming the first full-size actuator is sound.
- Note that this progress and plan represents an acceleration of the original program plan.

Preparers

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SCHEDULE, MILESTONES, AND DELIVERABLES

Phase I	1993						1994					
	J	A	S	O	N	D	J	F	M	A	M	J
CONTRACT START	◆											
Task 1: Materials Preparation and Device Design												
Purchase additional starting materials	△											
Formulate ceramic materials		—	—	—								
Materials characterization			—	—	—	—						
Model		—	—	—	—							
Task 2: Module Fabrication												
Prepare multilayer devices			—	—	—							
Burnout, isopress, and fire devices			—	—	—							
Polish and terminate devices				—	—	—						
Task 3: Device Testing												
Initial electrical characterization			—	—	—	—						
Initial mechanical characterization			—	—	—	—	—	—	—			
Force/displacement versus field and prestress			—	—	—	—	—	—	—			
Strain versus field			—	—	—	—	—	—	—			
(Hipotting)					—	—	—	—	—			
Reliability testing (extended cycling)					—	—	—	—	—	—		
Final "proof" characterization							—	—	—	—		
DELIVERABLES												△
REPORT												△

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EXPENDITURE CHART

3117-000 ONR
Co-Fired High-Force Actuators

